

CLAIMS

1. A living eye judging method comprising:

a first step of obtaining an image captured by shooting a subject with illumination coaxial with an optical axis of a camera; and

5 a second step of judging whether an eye included in the image is a living eye or not based on luminance in a pupil region of the eye in the image.

2. The method of Claim 1,

wherein in the second step, the eye is judged as a living eye when a difference in luminance between in the pupil region and in an iris region or a luminance ratio of the pupil region to the iris region is larger than a threshold value.

3. The method of Claim 1,

wherein in the first step, a plurality of images sequential in time are obtained, and in the second step, whether the eye is a living eye or not is judged based on time variation in a predetermined index for luminance in the pupil region obtained from the plurality of images.

4. The method of Claim 3,

wherein the predetermined index is an average value of luminance in the pupil region.

5. The method of Claim 3,

20 wherein the predetermined index is a ratio of luminance of the pupil region to the iris region.

6. The method of Claim 3,

wherein the predetermined index is a total sum of luminance values of each pixel in the pupil region.

25 7. The method of Claim 6,

wherein the total sum of the luminance values is normalized by an area of the iris region.

8. An living eye judging method comprising:

a first step of obtaining a first image captured by shooting a subject with illumination coaxial with an optical axis of a camera and a second image captured by shooting the subject with illumination having an optical axis different from the optical axis of the camera; and

a second step of judging whether an eye included in the first and second images is a living eye or not based on luminance in pupil regions of the eye in the first and second images.

9. The method of Claim 8,

wherein the second step includes the steps of:

obtaining a first luminance difference, which is a difference in luminance between the pupil region and an iris region in the first image, and a second difference, which is a difference in luminance between the pupil region and an iris region in the second image; and

judging the eye as a living eye when an absolute value of a difference between the first luminance difference and the second luminance difference is larger than a predetermined threshold value.

10. The method of Claim 8,

wherein the second step includes the steps of:

obtaining a first luminance ratio, which is a ratio in luminance of the pupil region to an iris region in the first image, and a second luminance ratio, which is a ratio in luminance of the pupil region to an iris region in the second image; and

judging the eye as a living eye when a ratio of the first luminance ratio to the second luminance ratio is larger than a predetermined threshold value.

11. A living eye judging device comprising:

a camera for shooting a subject;

an illumination section for illuminating the subject coaxially with an optical axis of

the camera; and

a living eye judgment section that receives an image captured by the camera with illumination by the illumination section and performs judgment as to whether an eye included in the image is a living eye or not based on luminance in a pupil region of the eye in the image.

5

12. A living eye judging device comprising:

a camera for shooting a subject;

a first illumination section for illuminating the subject coaxially with an optical axis of the camera;

10

a second illumination section for illuminating the subject on an optical axis different from the optical axis of the camera; and

a living eye judgment section that receives a first image captured by the camera with illumination by the first illumination section and a second image captured by the camera with illumination by the second illumination section and performs judgment as to whether an eye included in the first and second images is a living eye or not based on luminance in pupil regions of the eye in the first and second images.

15